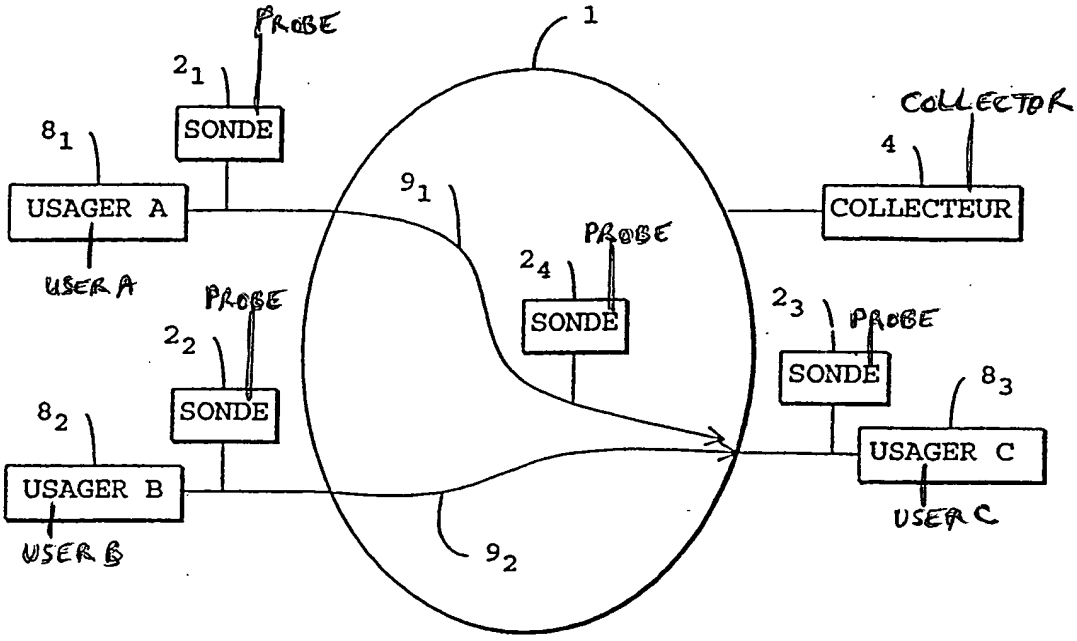

PROBE
2_1
SONDE
8_1
USAGER A
USER A
1
9_1
COLLECTOR
4
COLLECTEUR
PROBE
2_4
SONDE
PROBE
2_2
SONDE
8_2
USAGER B
USER B
9_2
2_3
PROBE
SONDE
8_3
USAGER C
USER C

FIG1

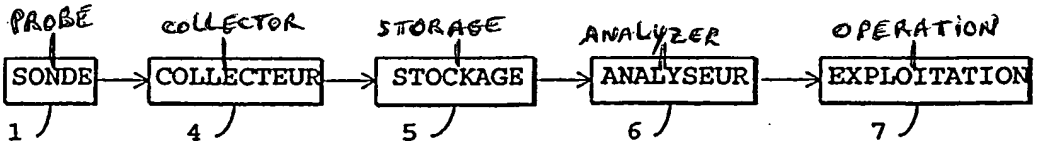

PROBE
SONDE
1
COLLECTOR
COLLECTEUR
4
STORAGE
STOCKAGE
5
ANALYZER
ANALYSEUR
6
OPERATION
EXPLOITATION
7

FIG2

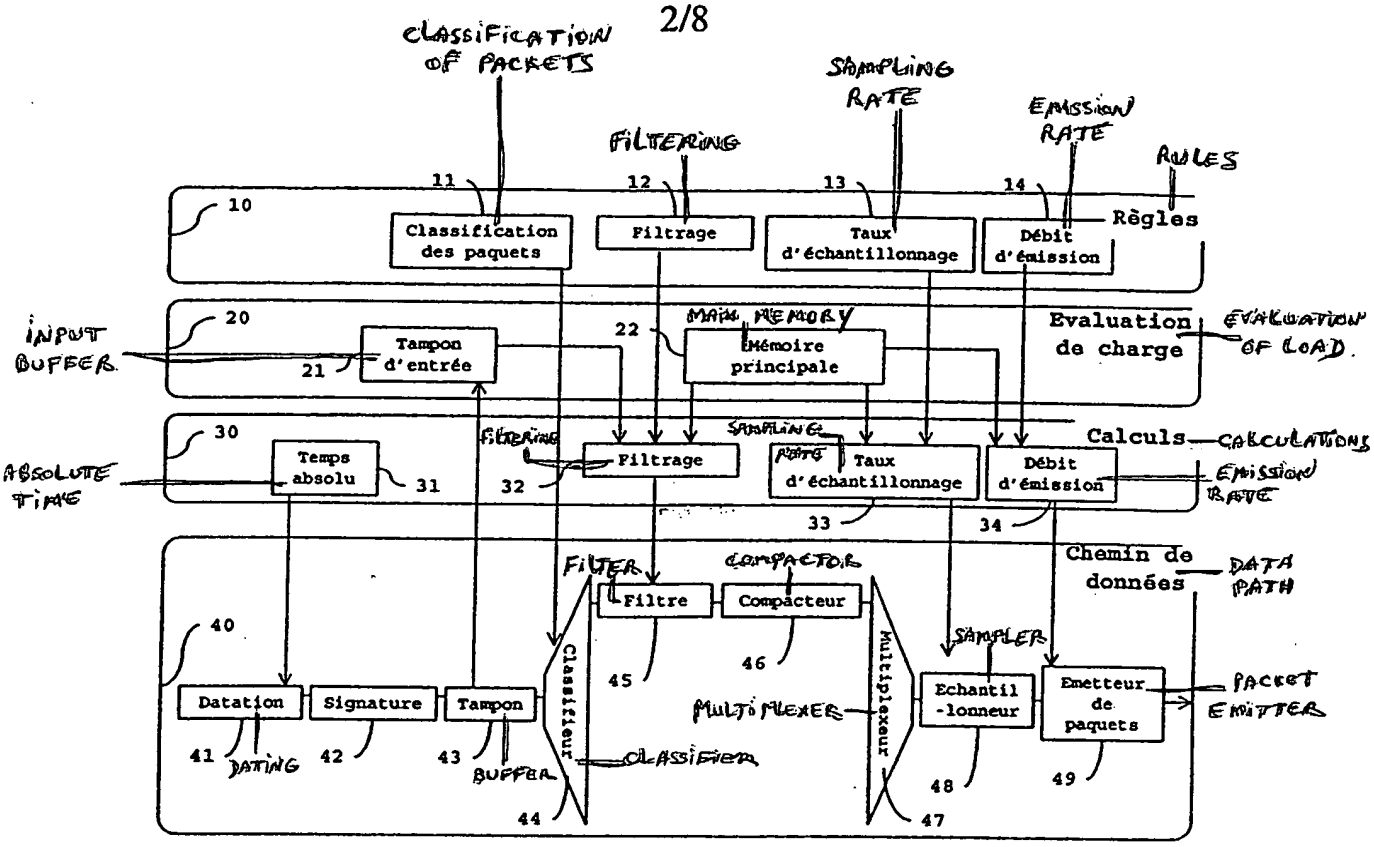

CLASSIFICATION OF PACKETS
FILTERING
SAMPLING RATE
EMISSION RATE
RULES
10
11
12
13
14
Classification des paquets
Filtrage
Taux d'échantillonnage
Débit d'émission
Règles
INPUT BUFFER
20
21
Tampon d'entrée
22
MAIN MEMORY
Mémoire principale
Evaluation de charge
EVALUATION OF LOAD
30
ABSOLUTE TIME
Temps absolu
31
32
Filtrage
SAMPLING RATE
Taux d'échantillonnage
Débit d'émission
Calculs
CALCULATIONS
EMISSION RATE
33
34
FILTER
COMPACTOR
Filtre
Compacteur
Chemin de données
DATA PATH
40
Datation
Signature
Tampon
41
DATING
42
43
BUFFER
Classifieur
CLASSIFIER
45
46
MULTIPLEXER
Multiplexeur
SAMPLER
Echantil-lonneur
Emetteur de paquets
PACKET EMITTER
44
47
48
49

FIG 3

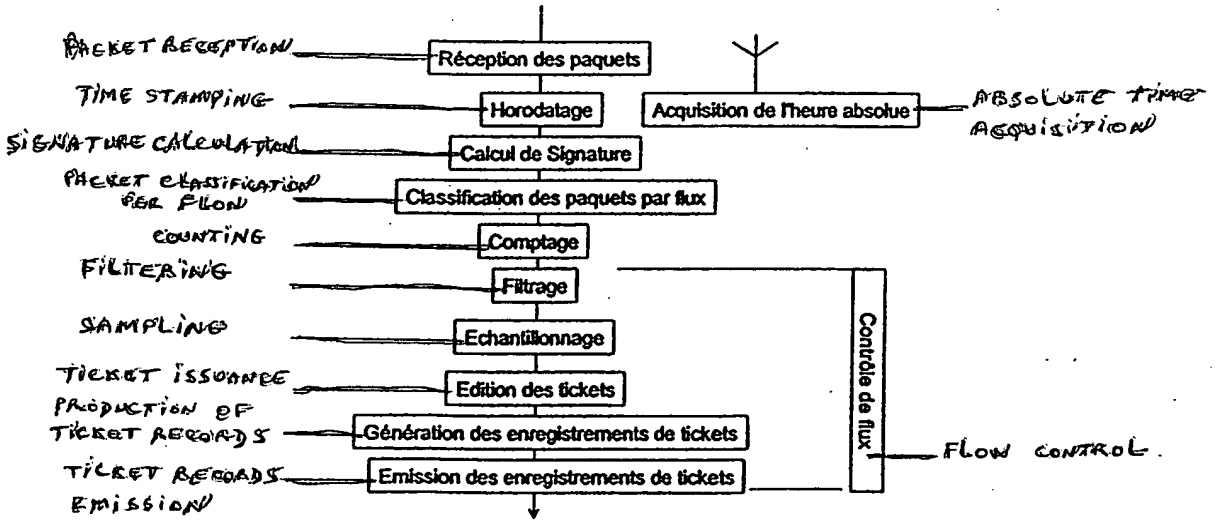

PACKET RECEPTION
Réception des paquets
TIME STAMPING
Horodatage
Acquisition de l'heure absolue
ABSOLUTE TIME ACQUISITION
SIGNATURE CALCULATION
Calcul de Signature
PACKET CLASSIFICATION PER FLOW
Classification des paquets par flux
COUNTING
Comptage
FILTERING
Filtrage
SAMPLING
Echantillonnage
TICKET ISSUANCE
Edition des tickets
PRODUCTION OF TICKET RECORDS
Génération des enregistrements de tickets
TICKET RECORDS EMISSION
Emission des enregistrements de tickets
Contrôle de flux
FLOW CONTROL

FIG 4

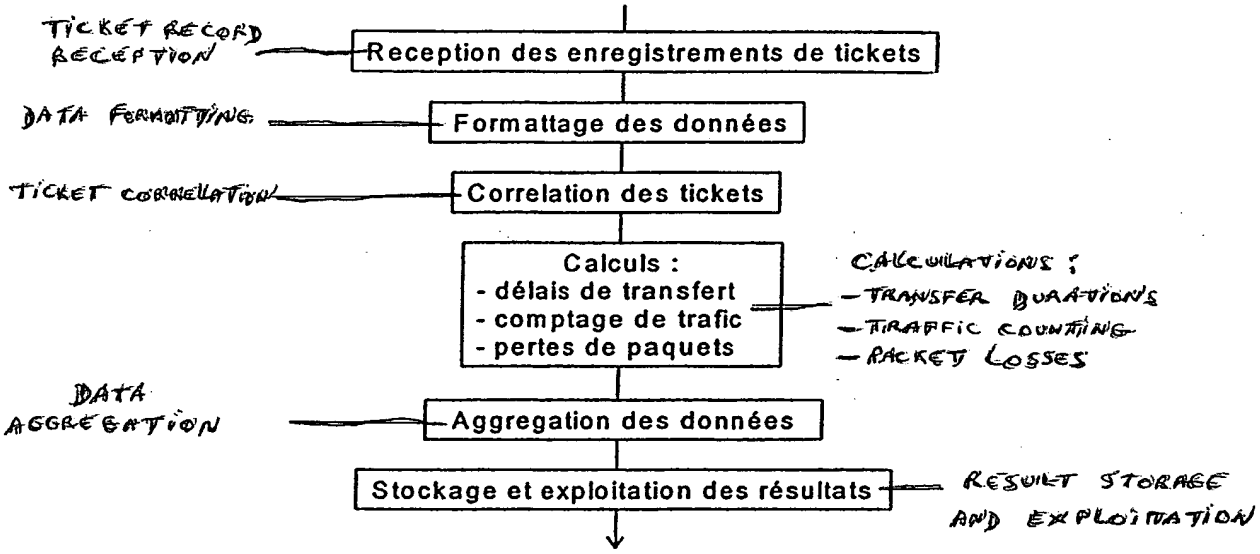

TICKET RECORD RECEPTION
Reception des enregistrements de tickets
DATA FORMATTING
Formattage des données
TICKET CORRELATION
Correlation des tickets
Calculs :
- délais de transfert
- comptage de trafic
- pertes de paquets
CALCULATIONS :
- TRANSFER DURATIONS
- TRAFFIC COUNTING
- PACKET LOSSES
DATA AGGREGATION
Aggregation des données
Stockage et exploitation des résultats
RESULT STORAGE AND EXPLOITATION

FIG 5

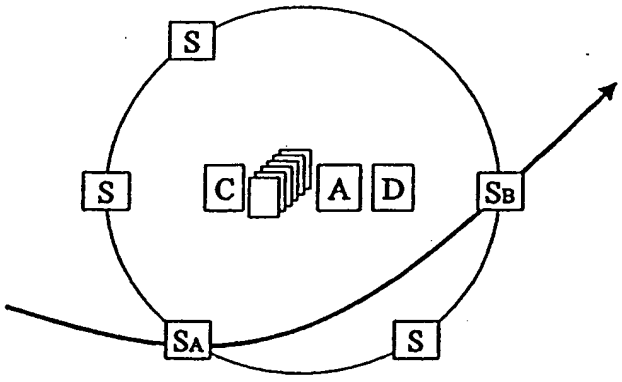

S
S
C
A
D
SB
SA
S

FIG 6

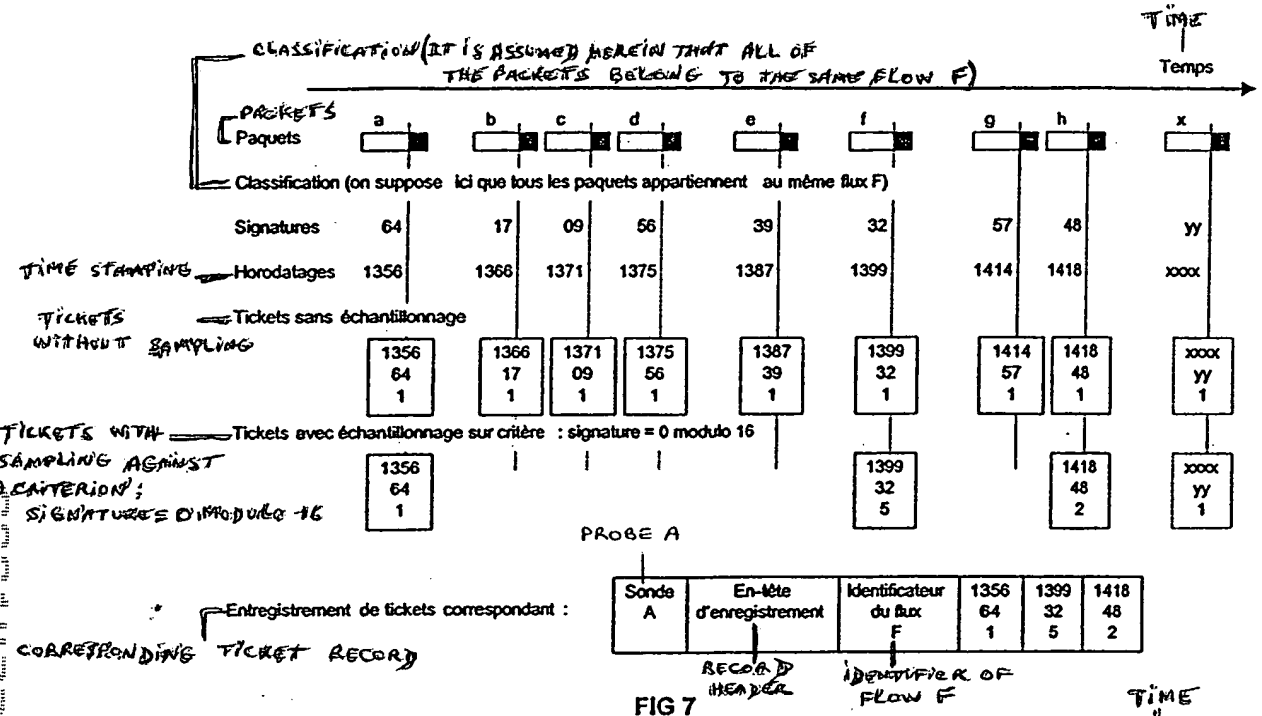

CLASSIFICATION (IT IS ASSUMED HEREIN THAT ALL OF THE PACKETS BELONG TO THE SAME FLOW F)
TIME
Temps
PACKETS
Paquets
a b c d e f g h x
Classification (on suppose ici que tous les paquets appartiennent au même flux F)
Signatures 64 17 09 56 39 32 57 48 yy
TIME STAMPING
Horodatages 1356 1366 1371 1375 1387 1399 1414 1418 xxxx
TICKETS WITHOUT SAMPLING
Tickets sans échantillonnage
1356 64 1 | 1366 17 1 | 1371 09 1 | 1375 56 1 | 1387 39 1 | 1399 32 1 | 1414 57 1 | 1418 48 1 | xxxx yy 1
TICKETS WITH SAMPLING AGAINST A CRITERION; SIGNATURES 0 MODULO 16
Tickets avec échantillonnage sur critère : signature = 0 modulo 16
1356 64 1 | 1399 32 5 | 1418 48 2 | xxxx yy 1
PROBE A
Entregistrement de tickets correspondant :
CORRESPONDING TICKET RECORD
Sonde A | En-tête d'enregistrement | Identificateur du flux F | 1356 64 1 | 1399 32 5 | 1418 48 2
RECORD HEADER
IDENTIFIER OF FLOW F

FIG 7

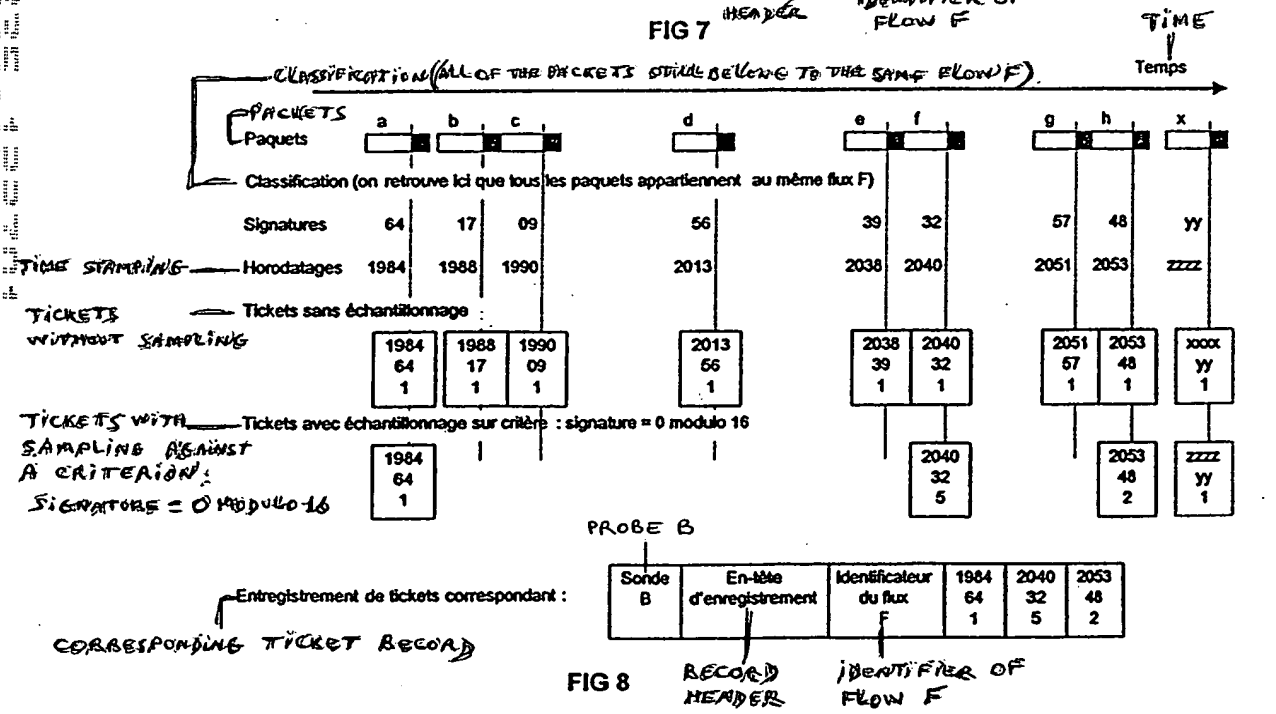

CLASSIFICATION (ALL OF THE PACKETS STILL BELONG TO THE SAME FLOW F)
TIME
Temps
PACKETS
Paquets
a b c d e f g h x
Classification (on retrouve ici que tous les paquets appartiennent au même flux F)
Signatures 64 17 09 56 39 32 57 48 yy
TIME STAMPING
Horodatages 1984 1988 1990 2013 2038 2040 2051 2053 zzzz
TICKETS WITHOUT SAMPLING
Tickets sans échantillonnage
1984 64 1 | 1988 17 1 | 1990 09 1 | 2013 56 1 | 2038 39 1 | 2040 32 1 | 2051 57 1 | 2053 48 1 | xxxx yy 1
TICKETS WITH SAMPLING AGAINST A CRITERION; SIGNATURE = 0 MODULO 16
Tickets avec échantillonnage sur critère : signature = 0 modulo 16
1984 64 1 | 2040 32 5 | 2053 48 2 | zzzz yy 1
PROBE B
Entregistrement de tickets correspondant :
CORRESPONDING TICKET RECORD
Sonde B | En-tête d'enregistrement | Identificateur du flux F | 1984 64 1 | 2040 32 5 | 2053 48 2
RECORD HEADER
IDENTIFIER OF FLOW F

FIG 8

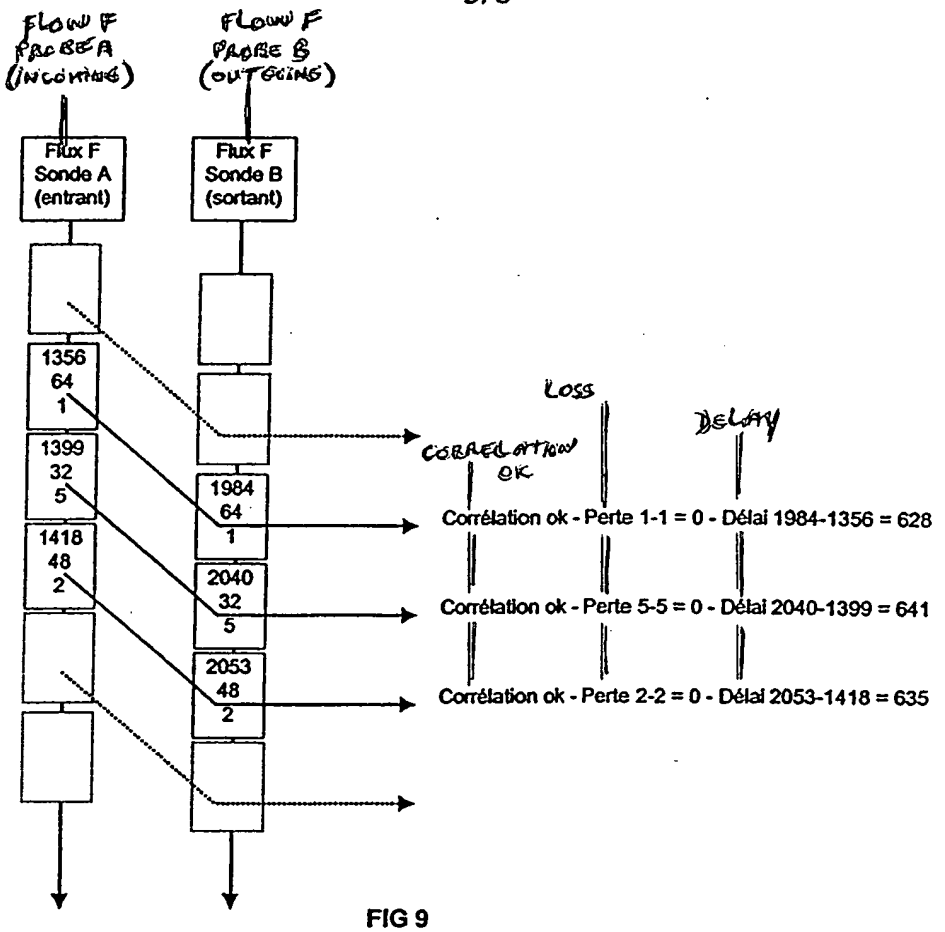

FLOW F PROBE A (INCOMING)
FLOW F PROBE B (OUTGOING)
Flux F Sonde A (entrant)
Flux F Sonde B (sortant)
1356 64 1
1399 32 5
1418 48 2
1984 64 1
2040 32 5
2053 48 2
LOSS
DELAY
CORRELATION OK
Corrélation ok - Perte 1-1 = 0 - Délai 1984-1356 = 628
Corrélation ok - Perte 5-5 = 0 - Délai 2040-1399 = 641
Corrélation ok - Perte 2-2 = 0 - Délai 2053-1418 = 635

FIG 9

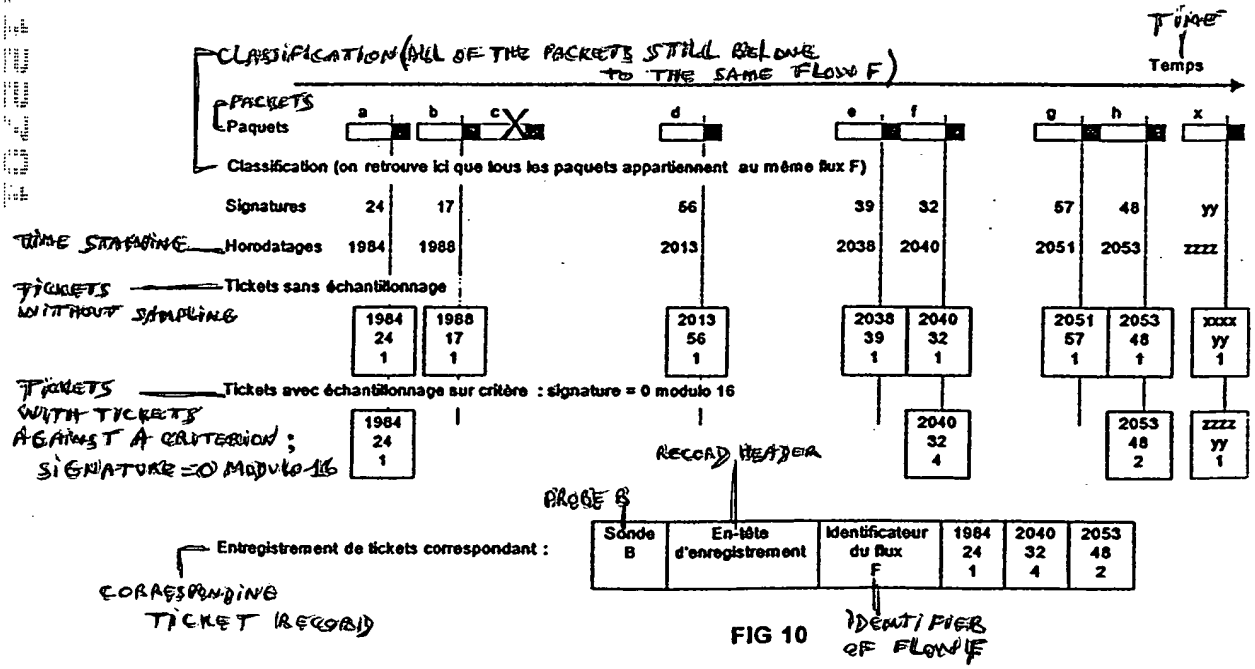

CLASSIFICATION (ALL OF THE PACKETS STILL BELONG TO THE SAME FLOW F)
TIME
Temps
PACKETS
Paquets
a b c d e f g h x
Classification (on retrouve ici que tous les paquets appartiennent au même flux F)
Signatures 24 17 56 39 32 57 48 yy
TIME STAMPING
Horodatages 1984 1988 2013 2038 2040 2051 2053 zzzz
TICKETS WITHOUT SAMPLING
Tickets sans échantillonnage
1984 24 1
1988 17 1
2013 56 1
2038 39 1
2040 32 1
2051 57 1
2053 48 1
xxxx yy 1
TICKETS WITH TICKETS AGAINST A CRITERION ; SIGNATURE=0 MODULO 16
Tickets avec échantillonnage sur critère : signature = 0 modulo 16
1984 24 1
2040 32 4
2053 48 2
zzzz yy 1
RECORD HEADER
PROBE B
Entregistrement de tickets correspondant :
CORRESPONDING TICKET RECORD
Sonde B
En-tête d'enregistrement
Identificateur du flux F
1984 24 1
2040 32 4
2053 48 2
IDENTIFIER OF FLOW F

FIG 10

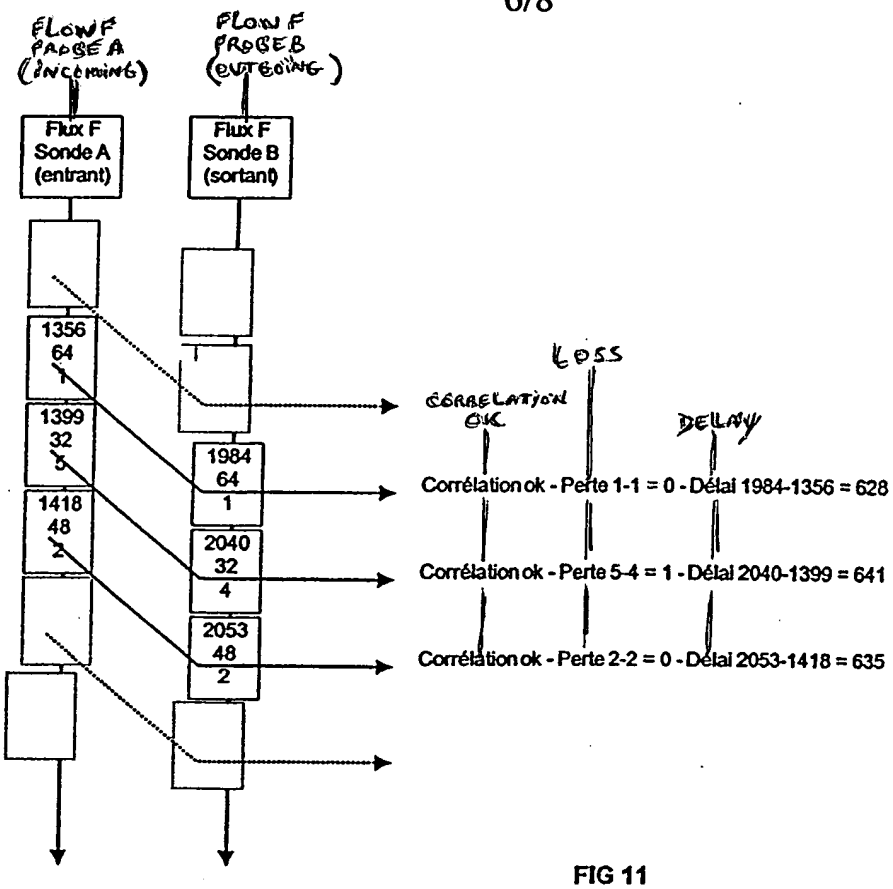

FLOW F PROBE A (INCOMING)
FLOW F PROBE B (OUTGOING)
Flux F Sonde A (entrant)
Flux F Sonde B (sortant)
1356 64 1
1399 32 5
1418 48 2
1984 64 1
2040 32 4
2053 48 2
LOSS
CORRELATION OK
DELAY
Corrélation ok - Perte 1-1 = 0 - Délai 1984-1356 = 628
Corrélation ok - Perte 5-4 = 1 - Délai 2040-1399 = 641
Corrélation ok - Perte 2-2 = 0 - Délai 2053-1418 = 635

FIG 11

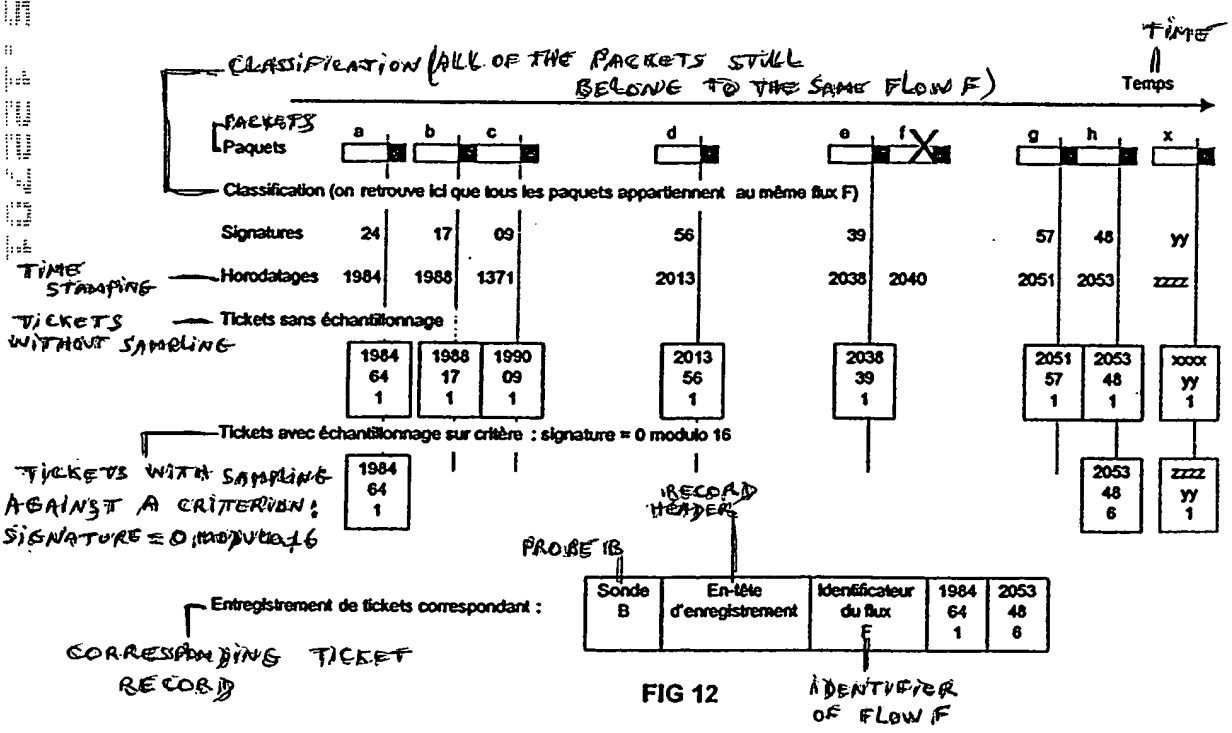

CLASSIFICATION (ALL OF THE PACKETS STILL BELONG TO THE SAME FLOW F)
TIME
Temps
PACKETS
Paquets
a b c d e f g h x
Classification (on retrouve ici que tous les paquets appartiennent au même flux F)
Signatures 24 17 09 56 39 57 48 yy
TIME STAMPING
Horodatages 1984 1988 1371 2013 2038 2040 2051 2053 zzzz
TICKETS WITHOUT SAMPLING
Tickets sans échantillonnage :
1984 64 1
1988 17 1
1990 09 1
2013 56 1
2038 39 1
2051 57 1
2053 48 1
xxxx yy 1
Tickets avec échantillonnage sur critère : signature = 0 modulo 16
TICKETS WITH SAMPLING AGAINST A CRITERION: SIGNATURE = 0 MODULO 16
1984 64 1
2053 48 6
zzzz yy 1
RECORD HEADER
PROBE B
Sonde B
En-tête d'enregistrement
Identificateur du flux F
1984 64 1
2053 48 6
Entregistrement de tickets correspondant :
CORRESPONDING TICKET RECORD
IDENTIFIER OF FLOW F

FIG 12

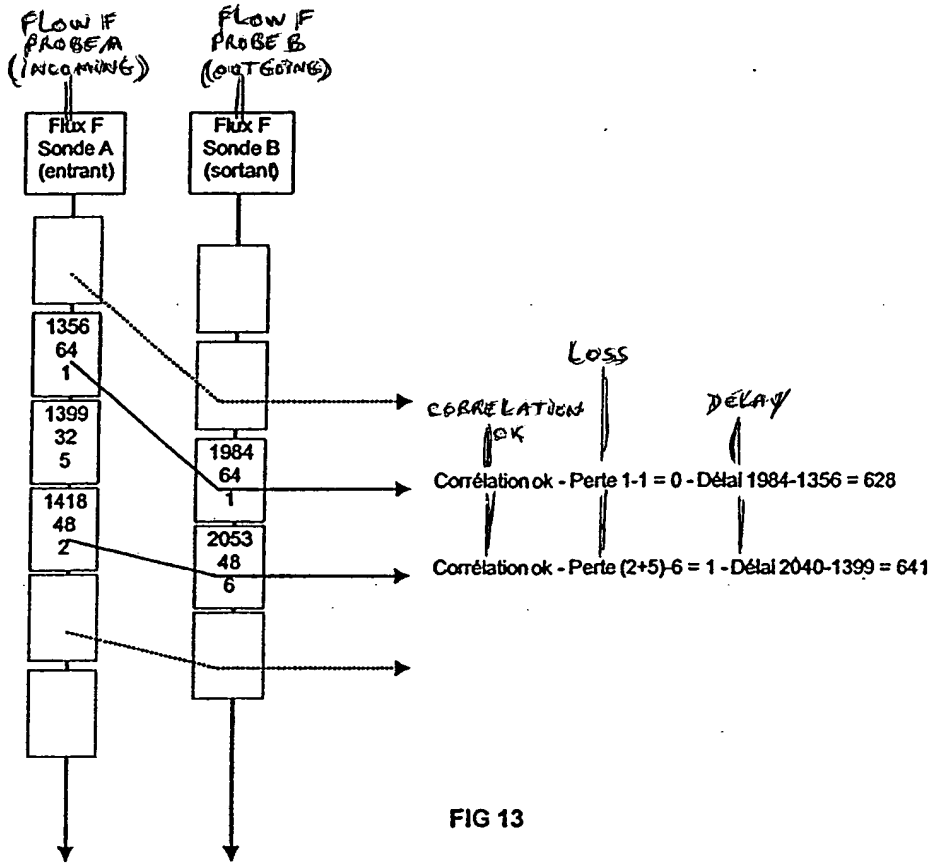

FLOW F PROBE A (INCOMING)
FLOW F PROBE B (OUTGOING)
Flux F Sonde A (entrant)
Flux F Sonde B (sortant)
1356 64 1
1399 32 5
1418 48 2
1984 64 1
2053 48 6
LOSS
CORRELATION ok
DELAY
Corrélation ok - Perte 1-1 = 0 - Délai 1984-1356 = 628
Corrélation ok - Perte (2+5)-6 = 1 - Délai 2040-1399 = 641

FIG 13

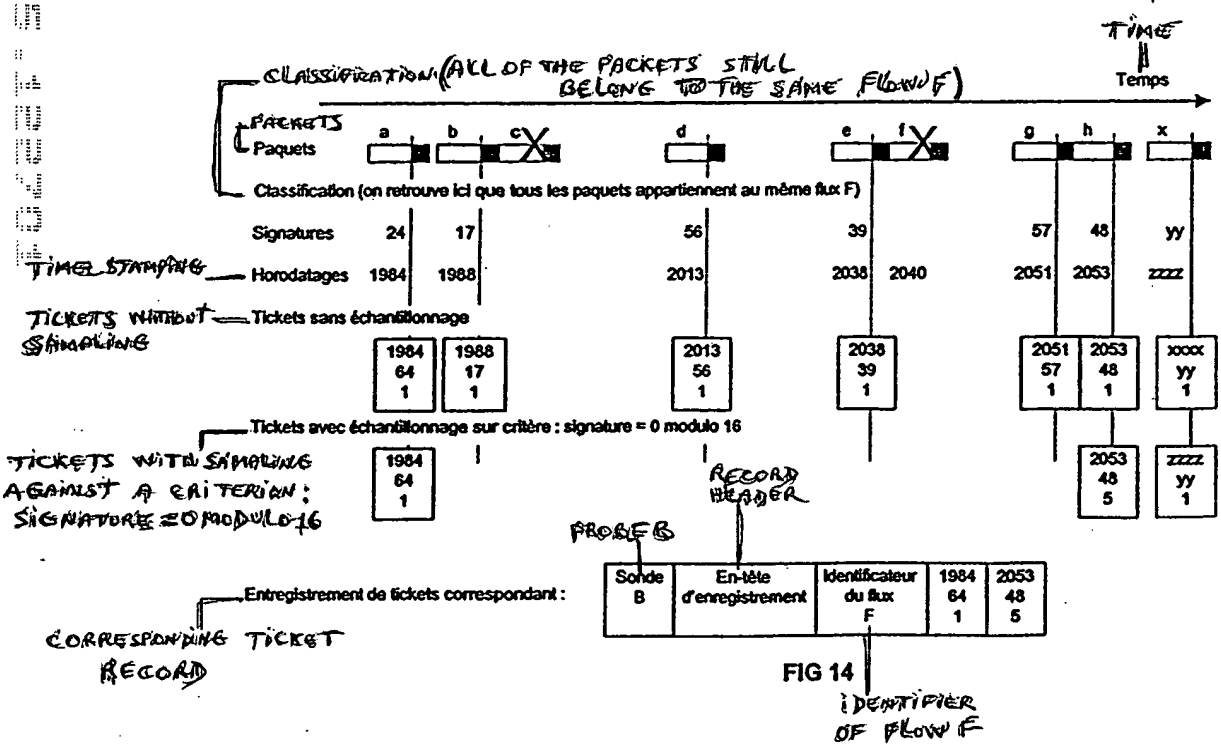

TIME
Temps
CLASSIFICATION (ALL OF THE PACKETS STILL BELONG TO THE SAME FLOW F)
PACKETS
Paquets
a b c d e f g h x
Classification (on retrouve ici que tous les paquets appartiennent au même flux F)
Signatures 24 17 56 39 57 48 yy
TIMER STAMPING
Horodatages 1984 1988 2013 2038 2040 2051 2053 zzzz
TICKETS WITHOUT SAMPLING
Tickets sans échantillonnage
1984 64 1
1988 17 1
2013 56 1
2038 39 1
2051 57 1
2053 48 1
xxxx yy 1
Tickets avec échantillonnage sur critère : signature = 0 modulo 16
TICKETS WITH SAMPLING AGAINST A CRITERION : SIGNATURE = 0 MODULO 16
1984 64 1
2053 48 5
zzzz yy 1
RECORD HEADER
PROBE B
Entregistrement de tickets correspondant :
CORRESPONDING TICKET RECORD
Sonde B
En-tête d'enregistrement
Identificateur du flux F
1984 64 1
2053 48 5
IDENTIFIER OF FLOW F

FIG 14

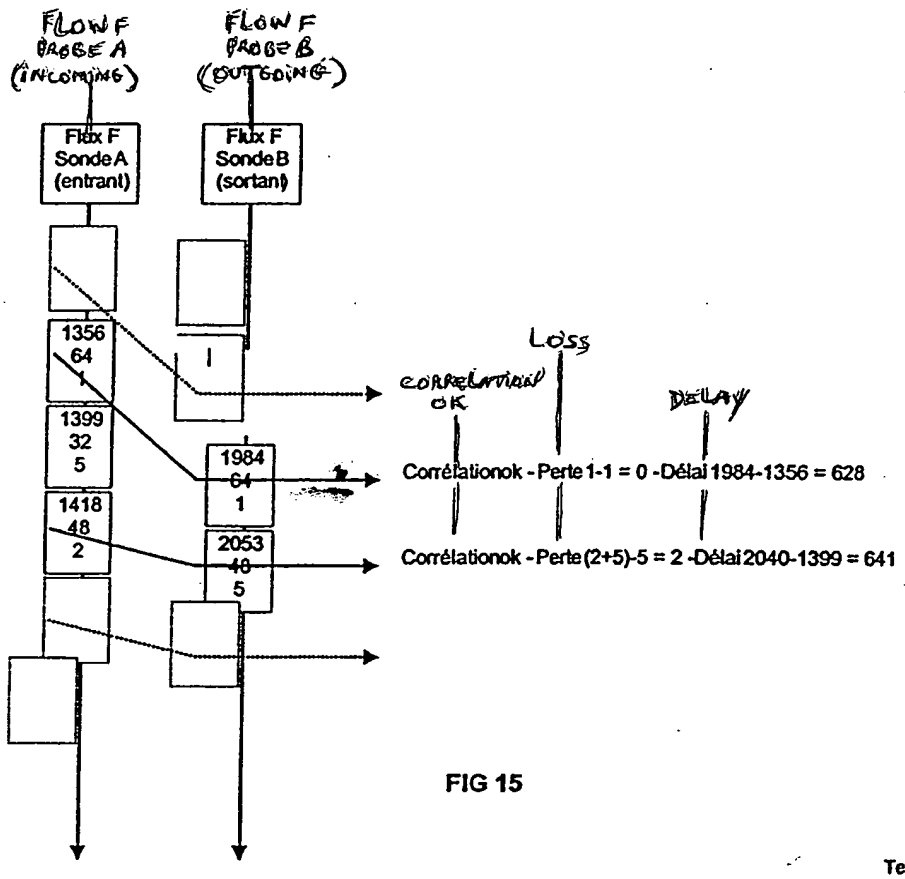
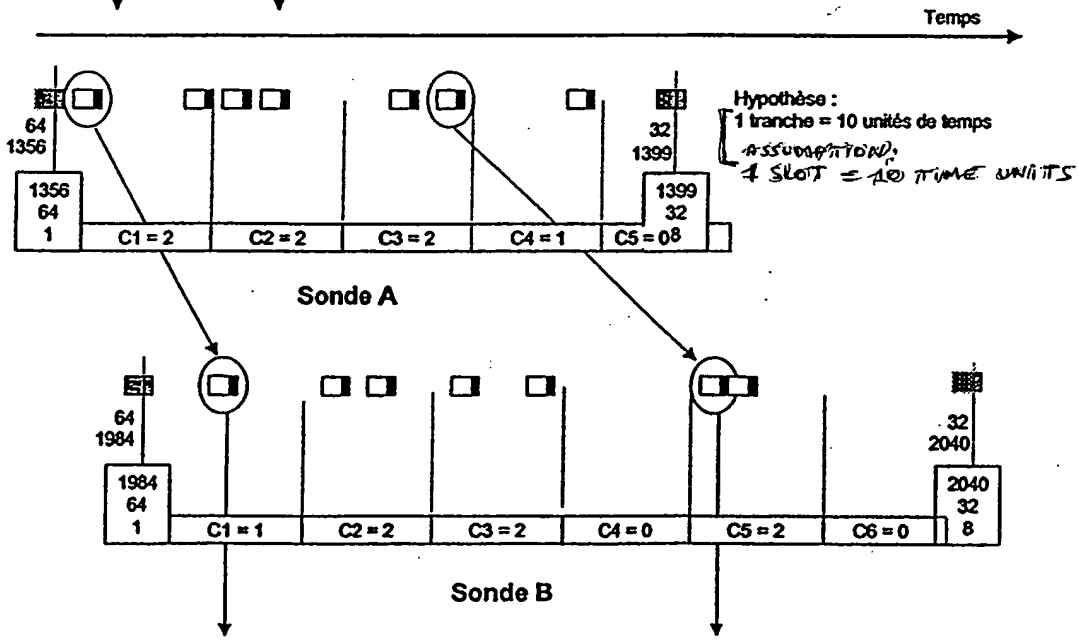


FIG 15



THE 1ST PACKET IS BEHIND THE INITIAL PACKET BY A DELAY OF C1-C1 = 0 TIME SLOT

THE 6TH PACKET IS BEHIND THE INITIAL PACKET BY A DELAY OF C5-C3 = 2 TIME SLOTS

FIG 16